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10/510,215

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Toru Nakakubo

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EXAMINER

RADEMAKER, CLAIRE L

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/510,215	<b>Applicant(s)</b> NAKAKUBO ET AL.	
	<b>Examiner</b> CLAIRE L. RADEMAKER	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10/5/04, 5/27/05, 4/9/09.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) 14-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/27/05</u> .   | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 1-13 in the reply filed on April 9, 2009 is acknowledged.

***Information Disclosure Statement***

2. The information disclosure statement filed May 27, 2009 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. Specifically, no relevancy statement for JP 2001-351667 has been received. However, it has been placed in the application file and the information referred to therein has been considered.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 & 12-13 contain the limitation "a charger for generating hydrogen, which is stored in a fuel tank of a fuel cell system, by electrolyzing water in an inside of the fuel

Art Unit: 1795

cell system" (claim 1, lines 1-4) which is indefinite because it is unclear how the charger / electrolyzer can electrolyze water inside the fuel cell system because 1) the fuel cell system is inside the charger / electrolyzer (preamble of claim 1, claim 4, instant Specification, page 4, line 26 – page 5, line 2; Figures 17-18s); and 2) the instant Specification clearly states that the water which is electrolyzed to make hydrogen / fuel is supplied from outside the system and from water that is discharged from the fuel cell system (instant Specification page 6, lines 11-14 & page 11, lines 13-16). For Examination purposes, this limitation is interpreted as meaning that a charger / electrolyzer generates hydrogen by electrolyzing water provided by a fuel cell system and/or an outside source, where the hydrogen is then stored in a fuel tank of a fuel cell system.

Furthermore, claim 5 contains the limitation "means that changes water into a mist state and supplies the water to the fuel cell system" (claim 5, lines 2-4) which is indefinite because it is unclear exactly how / where the mist is supplied to the fuel cell system.

Furthermore, claim 9 contains the limitation "the power control means controls electric power to be supplied to the fuel cell system on the basis of a signal from a pressure sensor" (claim 9, lines 1-4) which is indefinite because it is unclear why power would be provided to the fuel cell system instead of the electrolyzer on the basis of the pressure sensor signal.

### ***Claims Analysis***

Art Unit: 1795

5. The Examiner notes that the instant claims are drawn to an apparatus and that it has been held that while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (MPEP 2144) and that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim (MPEP 2144). Therefore, the process and functional limitations of the instant claims were not given patentable weight, and the apparatus of the instant claims was Examined in terms of structure.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Streckert et al. (US 6,447,945).

Art Unit: 1795

With regard to claim 1, Streckert et al. discloses a charger / electrolyzer (71, col. 8, lines 34-41; Figures 1 & 15) for generating hydrogen by electrolyzing water provided by a fuel cell system (33, col. 3, line 55; Figures 1-2 & 8-9) and/or an outside source (col. 8, lines 49-53 & col. 3, lines 3-9 & 16-30), where the hydrogen is then stored in a fuel tank of a fuel cell system (col. 8, lines 42-59), where said charger / electrolyzer comprises:

A water supply means that supplies water to the fuel cell system (col. 8, lines 49-56); and

A power supply means (col. 3, line 55 - col. 4, line 5; Figure 15) that supplies electric power to a power intake electrode (col. 3, line 55 - col. 4, line 5; Figures 1 & 15) of the fuel cell system that takes in electric power for electrolyzing the water into hydrogen (col. 7, line 47 – col. 8, line 2 & lines 42-62).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2-3 & 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Streckert et al. (US 6,447,945), as applied to claim 1 above, and further in view of Zhu et al. (US 2003/0198064).

The disclosure of Streckert et al. as discussed above is fully incorporated herein.

With regard to claims 2-3 & 8, Streckert et al. teaches that a power supply port of the power supply means is connected to the power intake electrode of the fuel cell system in a state in which the power supply port (col. 3, line 55 - col. 4, line 5; Figures 1 & 15), where the power supply means includes a plug for obtaining AC power supply from an outside (col. 3, line 55 - col. 4, line 5; Figures 1 & 15) and a power supply port that supplies power to the power intake electrode of the fuel cell system (col. 3, line 55 - col. 4, line 5; Figures 1 & 15), but fails to specifically state that the power supply port and the power intake electrode are insulated from the outside, or that the power supply means includes an AC/DC converter or a transformer.

While Streckert et al. fails to specifically state that the power supply port and the power intake electrode are insulated from the outside, one of ordinary skill in the art would understand it would be advantageous to insulate the power supply port and the power intake electrode from the outside in order to prevent them from the outside elements and minimize corrosion and damage.

Zhu et al. teaches that a power supply means for a fuel cell ([0041]) can comprise a transformer (paragraph [0014]), a rectifier circuit (which includes an AC/DC converter) (paragraph [0014]), and a power control means (paragraphs [0016] & [0009]-[0010]) in order to provide a boost starter converter for a fuel cell system and to limit voltage spikes (abstract & paragraphs [0009]-[0010]).

Art Unit: 1795

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of a power supply means for a fuel cell having a transformer, a rectifier circuit (which includes an AC/DC converter), and a power control means of Zhu et al. to the fuel cell system of Streckert et al. in order to provide a boost starter converter for the fuel cell system and to limit voltage spikes (abstract & paragraphs [0009]-[0010]).

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Streckert et al. (US 6,447,945), as applied to claim 1 above.

The disclosure of Streckert et al. as discussed above is fully incorporated herein.

With regard to claim 4, Streckert et al. fails to teach that the water supply means comprises means that supplies water in a state in which the fuel cell system is immersed in the water (i.e. that the fuel cell is immersed in the water supply means).

While Streckert et al. fails to teach that the water supply means comprises means that supplies water in a state in which the fuel cell system is immersed in the water (i.e. that the fuel cell is immersed in the water supply means), one of ordinary skill in the art at the time of the invention would understand it would be advantageous to immerse the fuel cell in the water supply means in order to create a more compact system.

Art Unit: 1795

Furthermore, it has been held that if a claimed invention reads on the prior art except with regard to the position of a component of a device, the invention is unpatentable if switching the position of the component would have not modified the operation of the device (MPEP 2144.04). In this case, immersing the fuel cell in the water supply means would not modify the operation of the device, which is to electrolyze water to make hydrogen that is then used as fuel in a fuel cell.

Furthermore, one of ordinary skill in the art would understand that immersing the fuel cell in the water supply means (i.e. in various positions / orientations) is an obvious matter of design choice (MPEP 2144.04) and that the charger / electrolyzer - fuel cell system of Streckert et al. would function properly (the same) when the fuel cell is immersed in the water supply tank because shifting the position/orientation of the fuel cell relative to the charger / electrolyzer would not have modified the operation of the system. It has been held that mere rearrangement of parts has no patentable significance if the rearrangement does not modify the operation of the device / system (MPEP 2144.04).

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Streckert et al. (US 6,447,945), as applied to claim 1 above, and further in view of McElroy (US 4,795,683).

The disclosure of Streckert et al. as discussed above is fully incorporated herein.

Art Unit: 1795

With regard to claim 5, Streckert et al. fails to teach that the water supply means comprises means that changes water into a mist state and supplies the mist to the fuel cell system.

McElroy teaches that a water supply means for supplying water to a fuel cell (col. 2, line 8) can comprise means that changes water into a mist state (an aspirator) and supplies the water to the fuel cell system (col. 2, lines 8-21) in order to allow cooling of the fuel cell without need for a separate cooling chamber (col. 2, lines 18-22).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the means that changes water into a mist state and supplies the mist to the fuel cell system of McElroy to the fuel cell system of Streckert et al. in order to allow cooling of the fuel cell without need for a separate cooling chamber (col. 2, lines 18-22).

12. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Streckert et al. (US 6,447,945), as applied to claim 1 above, and further in view of Kagitani (US 2002/0022162).

The disclosure of Streckert et al. as discussed above is fully incorporated herein.

With regard to claims 6-7, Streckert et al. fails to teach a cooler that cools the fuel tank of the fuel cell system, or a heater that heats a cell section of the fuel cell system.

Kagitani teaches that a fuel cell system (10, paragraph [0055]; Figure 2) can comprise a fuel tank / hydrogen storage tank (12, paragraph [0055]; Figure 2), a cooler /

Art Unit: 1795

cooling loop that cools the fuel tank of the fuel cell system (paragraph [055]; Figure 2), and a heater / heat pump & heat exchanger (5b & 5a, paragraph [0055]; Figure 2) which heat a cell section of the fuel cell system (paragraph [0055]; Figure 2) in order to increase storage rate of fuel / hydrogen in the fuel tank and to maintain efficiency of the fuel cell system (paragraph [0055]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of having a cooler / cooling loop cool the fuel tank and the concept of a heater / heat pump & heat exchanger heating a cell section of the fuel cell system of Kagitani to the fuel cell system of Streckert et al. in order to increase storage rate of fuel / hydrogen in the fuel tank and to maintain efficiency of the fuel cell system (paragraph [0055]).

13. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Streckert et al. (US 6,447,945), as applied to claim 1 above, and further in view of Togasawa et al. (US 2002/0014277).

The disclosure of Streckert et al. as discussed above is fully incorporated herein.

With regard to claims 9-10, Streckert et al. fails to teach a pressure sensor provided in the fuel tank of the fuel cell system, a valve control means, or a fuel supply valve provided in a fuel flow path that introduces hydrogen to the fuel cell.

Art Unit: 1795

Togasawa et al. teaches the concept of fuel cell (6, paragraph [0052]) comprising a fuel / hydrogen tank (3, paragraphs [0029] & [053]) comprising a pressure sensor (paragraphs [0029] & [0053]) that detects the pressure within the fuel / hydrogen tank (paragraphs [0022] & [0029]), a fuel supply valve (5, paragraphs [0029] & [0052]), and a controller (paragraphs [0029] & [0053]) that controls said valve to vary the hydrogen-filling rate depending upon the pressure detected by said sensor (paragraphs [0029]-[0030]) in order to allow the fuel / hydrogen tank to be filled rapidly while suppressing exothermic phenomenon during the course of filling (paragraph [0001]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of a fuel cell comprising a fuel tank with a pressure sensor that detects the pressure within the fuel tank, a valve, and a controller that controls said valve to vary the hydrogen-filling rate depending upon the pressure detected by said sensor of Togasawa et al. to the fuel cell system of Streckert et al. in order to allow the fuel / hydrogen tank to be filled rapidly while suppressing exothermic phenomenon during the course of filling (paragraph [0001]).

14. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Streckert et al. (US 6,447,945), as applied to claim 1 above, and further in view of Shimada (JP 2001-266915).

The disclosure of Streckert et al. as discussed above is fully incorporated herein.

Art Unit: 1795

With regard to claim 11, Streckert et al. fails to teach a residual capacity detecting means.

Shimada teaches that a fuel tank / hydrogen tank in a fuel cell system can comprise a residual capacity detecting means / residual amount detecting means (52, abstract & paragraph [0006]) which detects if the amount of remaining fuel / hydrogen in the fuel tank / hydrogen tank has reached a level where the regeneration of fuel / hydrogen is necessary (abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the residual capacity detecting means / residual amount detecting means of Shimada to the fuel tank of Streckert et al. in order to allow determination of whether the amount of remaining fuel / hydrogen in the fuel tank / hydrogen tank has reached a level where the regeneration of fuel / hydrogen is necessary (abstract).

15. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Streckert et al. (US 6,447,945) in view of Zhu et al. (US 2003/0198064) and Togasawa et al. (US 2002/0014277).

With regard to claims 12-13, Streckert et al. teaches a charger / electrolyzer (71, col. 8, lines 34-41; Figures 1 & 15) for generating hydrogen by electrolyzing water provided by a fuel cell system (33, col. 3, line 55; Figures 1-2 & 8-9) and/or an outside source (col. 8, lines 49-53 & col. 3, lines 3-9 & 16-30), where the hydrogen is then stored in a fuel tank of a fuel cell system (col. 8, lines 42-59), where said charger /

Art Unit: 1795

electrolyzer comprises a power supply means (col. 3, line 55 - col. 4, line 5; Figure 15) that supplies electric power to a power intake electrode (col. 3, line 55 - col. 4, line 5; Figures 1 & 15) of the fuel cell system that takes in electric power for electrolyzing the water into hydrogen (col. 7, line 47 – col. 8, line 2 & lines 42-62), but fails to teach a power control means, a pressure sensor provided in the fuel tank of the fuel cell system, a valve control means, or a fuel supply valve.

Zhu et al. teaches that a power supply means for a fuel cell ([0041]) can comprise a transformer (paragraph [0014]), a rectifier circuit (which includes an AC/DC converter) (paragraph [0014]), and a power control means (paragraphs [0016] & [0009]-[0010]) in order to provide a boost starter converter for a fuel cell system and to limit voltage spikes (abstract & paragraphs [0009]-[0010]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of a power supply means for a fuel cell having a transformer, a rectifier circuit (which includes and AC/DC converter), and a power control means of Zhu et al. to the fuel cell system of Streckert et al. in order to provide a boost starter converter for the fuel cell system and to limit voltage spikes (abstract & paragraphs [0009]-[0010]).

Modified Streckert et al. fails to teach a pressure sensor provided in the fuel tank of the fuel cell system.

Togasawa et al. teaches the concept of fuel cell (6, paragraph [0052]) comprising a fuel / hydrogen tank (3, paragraphs [0029] & [053]) comprising a pressure sensor (paragraphs [0029] & [0053]) that detects the pressure within the fuel / hydrogen tank

Art Unit: 1795

(paragraphs [0022] & [0029]), a fuel supply valve (5, paragraphs [0029] & [0052]), and a controller (paragraphs [0029] & [0053]) that controls said valve to vary the hydrogen-filling rate depending upon the pressure detected by said sensor (paragraphs [0029]-[0030]) in order to allow the fuel / hydrogen tank to be filled rapidly while suppressing exothermic phenomenon during the course of filling (paragraph [0001]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of a fuel cell comprising a fuel tank with a pressure sensor that detects the pressure within the fuel tank, a valve, and a controller that controls said valve to vary the hydrogen-filling rate depending upon the pressure detected by said sensor of Togasawa et al. to the fuel cell system of modified Streckert et al. in order to allow the fuel / hydrogen tank to be filled rapidly while suppressing exothermic phenomenon during the course of filling (paragraph [0001]).

### ***Conclusion***

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CLAIRE L. RADEMAKER whose telephone number is (571)272-9809. The examiner can normally be reached on Monday - Friday, 8:00AM - 4:30PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. L. R./  
Examiner, Art Unit 1795

/Alexa D. Neckel/  
Supervisory Patent Examiner, Art Unit 1795